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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/789,744

02/27/2004

Wai Yuen Ho

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07/25/2008

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INTELLECTUAL PROPERTY ADMINISTRATION  
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EXAMINER

LIANG, LEONARD S

ART UNIT

PAPER NUMBER

2853

NOTIFICATION DATE

DELIVERY MODE

07/25/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/789,744	<b>Applicant(s)</b> HO, WAI YUEN	
	<b>Examiner</b> LEONARD S. LIANG	<b>Art Unit</b> 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-7 and 9-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-7 and 9-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-7, and 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al (US Pat 5097189) in view of Carnagua (US Pat 2176202) and Black et al (US Pat 3780652).

Ito et al discloses:

- {claim 1} A carriage drive system (figure 1); a variable speed drive motor configured to propel a movable carriage along a slide rod, wherein the movable carriage supports print heads having an ink ejecting nozzle, and wherein the variable speed drive motor is an electric motor (figure 1, references 2, 3A, 3B, and 6; abstract; column 4, lines 44-54)
- {claim 7} A printer (figure 1); a movable carriage supporting print heads having an ink ejecting nozzle (figure 1, reference 2); a slide rod for supporting and guiding the movable carriage (figure 1, reference 3A, 3B); a variable speed drive motor configured to propel the movable carriage along the slide rod (figure 1, reference

6), wherein the variable speed drive motor is an electric motor  
(column 4, lines 49-50)

- {claim 14} A method of printing (figure 1); comprising activating a variable speed drive motor to propel a movable carriage along a slide rod, wherein the movable carriage supports print heads having an ink ejecting nozzle and wherein the variable speed drive motor is an electric motor (figure 1; abstract; column 4, lines 44-54)

Ito et al differs from the claimed invention in that it does not disclose:

- {claim 1} an electric motor having a gear ratio resulting in a high carriage speed and a gear ratio resulting in a low carriage speed; and a centrifugal clutch operable to switch between the gear ratio resulting in a high carriage speed and the gear ratio resulting in a low carriage speed wherein the centrifugal clutch is an automatic two-way clutch, such that switching between the gear ratio resulting in the high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically based upon the operational speed of the drive motor
- {claims 3 and 7} wherein the gearing mechanism is a planetary gear assembly having a sun gear driven by the drive motor; a ring gear; and a plurality of planet gears associated with a planet carrier

- {claims 4 and 10} wherein operation of the drive motor at a high speed causes the centrifugal clutch to engage the ring gear causing the planet gears and the drive gear to be locked together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio and operation of the drive motor at a low speed causes the mechanism/centrifugal clutch for switching between gear ratios to disengage the ring gear causing the sun gear to turn the planet gears which turn the ring gear resulting in a gear ratio greater than 1:1
- {claims 5 and 11} further comprising a speed calibration member for adjusting the gear ratio between the drive motor and the ring gear
- {claims 6 and 12} wherein the gear ratio between the drive motor and the ring gear is proportional to a friction force between the planet carrier and the speed calibration member
- {claim 7} a gearing mechanism having a gear ratio resulting in a high carriage speed and a gear ratio resulting in a low carriage speed; and a centrifugal clutch operable to switch between the gear ratios wherein the centrifugal clutch is an automatic two-way clutch, such that switching between the gear ratio resulting in a high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in a low carriage speed to the gear ratio resulting in a high carriage speed

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both occur automatically based upon the operational speed of the drive motor

- {claim 13} wherein the speed calibration member is manually adjustable
- {claim 14} a motor having a gear ratio resulting in a high carriage speed and a gear ratio resulting in a low carriage speed; switching between the gear ratio resulting in a high carriage speed and the gear ratio resulting in a low carriage speed; wherein switching between the gear ratio resulting in a high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically by means actuated by the operational speed of the drive motor

The limitations not found in Ito are limitations which are characteristic of a motor comprising a two-way clutch.

Carnagua discloses a mechanical drive mechanism comprising a centrifugal two-way universal clutch (figure 2). Even though Carnagua does not disclose that its two-way clutch could be applied in carriage drive printing contexts, the use of clutch mechanisms have been known to be used in such contexts. For example, Black et al (US Pat 3780652) discloses driving a printing system driving a carriage using a two-way universal clutch (column 11, lines 11-24).

Carnagua further discloses:

- {claims 3 and 7} wherein the gearing mechanism is a planetary gear assembly having a sun gear driven by the drive motor; a ring gear; and a plurality of planet gears associated with a planet carrier (column 2, lines 37-55; column 3, lines 1-8; column 4, lines 37-72; column 5, lines 21-43)
- {claims 4 and 10} wherein operation of the drive motor at a high speed causes the centrifugal clutch to engage the ring gear causing the planet gears and the drive gear to be locked together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio and operation of the drive motor at a low speed causes the mechanism/centrifugal clutch for switching between gear ratios to disengage the ring gear causing the sun gear to turn the planet gears which turn the ring gear resulting in a gear ratio greater than 1:1 (column 2, lines 37-55; column 3, lines 1-8; column 4, lines 37-72; column 5, lines 21-43)
- {claims 5 and 11} further comprising a speed calibration member for adjusting the gear ratio between the drive motor and the ring gear (column 2, lines 37-55; column 3, lines 1-8; column 4, lines 37-72; column 5, lines 21-43)
- {claims 6 and 12} wherein the gear ratio between the drive motor and the ring gear is proportional to a friction force between the planet carrier and the speed calibration member (column 2, lines

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37-55; column 3, lines 1-8; column 4, lines 37-72; column 5, lines 21-43)

- {claim 13} wherein the speed calibration member is manually adjustable (column 2, lines 37-55; column 3, lines 1-8; column 4, lines 37-72; column 5, lines 21-43)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the speed controlling carriage driving motor of Ito et al (which uses energized coils as opposed to gears) with a speed controlling carriage driving motor comprising the centrifugal clutch mechanism of Floyd. The motivation for the skilled artisan in doing so is to gain the benefit of obtaining a more cost-efficient drive system, since building a motor comprised of gears may be more economically feasible to some than building a motor comprised of energized coils.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al (US Pat 5097189) in view of Floyd (US Pat 3071018) and Black et al (US Pat 3780652).

Ito et al discloses:

- {claim 14} A method of printing (figure 1); comprising activating a variable speed drive motor to propel a movable carriage along a slide rod, wherein the movable carriage supports print heads having an ink ejecting nozzle and wherein the variable speed drive motor is an electric motor (figure 1; abstract; column 4, lines 44-54)



Ito et al differs from the claimed invention in that it does not disclose:

- {claim 14} a motor having a gear ratio resulting in a high carriage speed and a gear ratio resulting in a low carriage speed; switching between the gear ratio resulting in a high carriage speed and the gear ratio resulting in a low carriage speed; wherein switching between the gear ratio resulting in a high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically by means actuated by the operational speed of the drive motor

The limitations not found in Ito are limitations which are characteristic of a motor comprising a two-way clutch.

Floyd discloses a mechanical drive mechanism comprising a two-way universal clutch. Even though Floyd does not disclose that its two-way clutch could be applied in carriage drive printing contexts, the clutch mechanism of Floyd has been known to be used in such contexts. As a demonstrative example, Black et al (US Pat 3780652) discloses driving a printing system driving a carriage using the two-way universal clutch of Floyd (column 11, lines 11-24).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the speed controlling carriage driving motor of Ito et al (which uses energized coils as opposed to gears) with a speed controlling carriage driving motor comprising the two-way clutch mechanism of Floyd. The motivation for the skilled artisan in doing so is to gain the benefit of

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cheaper materials, since building a motor comprised of gears may be more economically feasible to some than building a motor comprised of energized coils.

### ***Response to Arguments***

Appellant's arguments filed 04/28/08 have been fully considered but they are not fully persuasive.

The Appellant made two primary arguments.

First, the Appellant argued that "even if the recording device of Ito et al were combined with the mechanical drive mechanism of Floyd as suggested in the Final Office Action, the combination would not have shown all of the claimed invention." Specifically, the Appellant argued that "Floyd fails to disclose or fairly suggest any mechanism for the recited feature that switching between the gear ratio resulting in the high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically based upon the operational speed of the drive motor...Floyd fails to disclose or fairly teach any means for making the rotation of the shaft 80 other than manually, especially one adopted for being combined with the printing device of Ito et al."

This argument fails for two reasons. First, Ito et al discloses automatic motor speed control. The only thing that Ito doesn't disclose is the mechanical drive system of a clutch. The combination of Ito et al in view of Floyd naturally

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discloses automatic gear switching. Furthermore, the Appellant suggests that Floyd is not adopted to be combined with the printing device of Ito et al. However, Black et al clearly discloses a printing system using the clutch mechanism of Floyd.

The Appellant's second argument is that "Ito et al and Floyd are not combinable with each other as suggested in the Final Office Action...Such close-loop control of the rotational speed of the motor 6 to the speed in the high or low speed mode and the required stop and start time of Ito et al. cannot be achieved using the mechanical drive mechanism of Floyd, which requires a shut-down and a start-up of the input shaft 1 in Fig. 1 'whenever the speed control shaft is changed.'

There has been no evidence cited showing that the clutch of Floyd could not achieve the required stop and start time of Ito et al. Furthermore, Floyd clearly discloses that its greatest single merit is its extremely wide speed range (column 10, lines 35-36). This suggests that Floyd is able to achieve even the required stop and start time of Ito et al. However, even if Floyd does not achieve the same stop and start times of Ito et al, the combination is still proper. It is well known in the art that there are tradeoffs between speed and cost. Even if Floyd performed at a slower speed than the invention of Ito, one of ordinary skill in the art would be motivated to use the clutch of Floyd for cost savings.

Despite the fact that the Appellant's two main arguments are unpersuasive, a new non-final rejection has herein been issued. The reason for this is because the examiner determined that Floyd, while disclosing a clutch,

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does not disclose a centrifugal clutch. The examiner learned that a centrifugal clutch is a specific term in the art and the examiner decided that the term was previously interpreted more broadly than would be reasonable. Therefore, even though the Appellant's arguments were not fully persuasive, a new rejection has been made which incorporates a centrifugal clutch, as shown above.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEONARD S. LIANG whose telephone number is (571)272-2148. The examiner can normally be reached on 8:30-5 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. S. L./  
Examiner, Art Unit 2853  
06/28/08

/STEPHEN D. MEIER/  
Supervisory Patent Examiner, Art Unit 2853